

APPENDIX H-HARDBOTTOM HABITAT CREATION

1. The information provided below pertains to hardbottom habitat creation in the vicinity of the Richardson Reef Site. This is preliminary information intended to be made more specific as the project progresses through planning, design and construction.

2. The hardbottom habitat location is in the vicinity of the existing Richardson Reef. This reef is centered at 28 degrees, 31.533 minutes latitude and 82 degrees, 55.052 minutes longitude. The site has a ¼ mile radius. The Richardson Reef was permitted in 1978 (Corps of Engineers permit number 77N-0983, also provided). The original deployment of material, made in 1978, consisted of concrete culverts. These culverts are located at 28 degrees, 31.460 minutes latitude and 82 degrees, 55.090 minutes longitude. In June 1989 a second deployment was made consisting of concrete rubble from the demolition of the old Sunshine Skyway bridge. This concrete rubble, as well as old tires, are located at the center of the existing reef site. Water depths are from 15 to 20 feet. The hardbottom habitat created will be near this reef site and will be designed and constructed to not impact the existing reef. Three figures are provided as follows: Figure A. The location/limits of the existing Richardson Reef site drawn on the latest NOAA nautical chart.; Figure B. Plan view drawing showing the concept for the proposed hardbottom habitat configuration, distance of separation of the site material and the limit of the placement area; Figure C. Side view conceptual drawing showing the maximum elevation of the site and depth of water above the site. All coordinates were collected using Garmin Global Positioning System 76.

3. The primary objective of the existing reef is to be a fish haven that enhances recreational fishing and diving. The primary objective of the site is to create hardbottom to enhance recreational fisheries and recreational diving.

4. Siting the hardbottom habitat:

a. The concept to place the hardbottom habitat in the vicinity of the existing Richardson Reef is based on target species, socio-economic considerations, geologic considerations, hydrographic considerations, water quality considerations and biological considerations. The species possibly using the present Hernando Beach channel are thought to also use the type of hardbottom habitat to be created. The Richardson Reef site is the closest permitted reef to the source of the hardbottom materials. The bottom in the vicinity of the Richardson Reef consists of a thin veneer of sand on top of limerock and is thought to be able provide a stable base for the sand and limerock to be placed there to create hardbottom habitat.

b. Coordinates of site: The center of the existing Richardson Reef is at 28 degrees, 31.533 minutes latitude and 82 degrees, 55.052 minutes longitude. The existing site has a ¼ mile radius. The hardbottom habitat created would be within a rectangle encompassing this area.

5. Target species-Fish observed at the site include grouper, hog fish, jewfish, Atlantic spade fish, sheephead and stingray. The target species are demersal fish, benthic organisms, sponges, and algae.

6. Socio-economics-The site is in an area of high user need. A factor limiting the use of the site for recreational fishing and diving is the lack of hardbottom or reef in the permitted area. Public launch facilities are adequate and are approximately 14 miles away at the Hernando Beach public boat ramp. This boat ramp has parking and restroom facilities. They are close enough to shore to meet the needs of large and small boat fisherman and to allow safe and easy access.

7. Site surveys:

a. The site was inspected to assess substrate type (geologic considerations), water depth and prevailing wave and current data (hydrographic considerations), water quality and existing habitat type and quality, local fishery resources (biological considerations), cultural resources, and past-present-future possible uses for the site on April 4, 2003.

b. Geologic considerations - The bottom composition is sand and rock. Due to the thinness of the layer of sand and hardness of the underlying rock it is not expected that the material placed at the site will subside or become buried. Anchoring is not expected to be required.

c. Hydrographic considerations - The water depth is approximately between 15 and 20 feet. The prevailing wave direction at the site is southwest to northeast.

d. Water quality considerations - Water quality conditions at the site are generally very good and vary on a day-to-day basis. There are no known salinity, dissolved oxygen, turbidity, nutrient loads, pollution levels, or water temperature issues that would render the site unacceptable for the proposed hardbottom habitat.

e. Biological considerations - At the existing reef there are coral outcrops/formations and live bottoms. Further biological surveys will be conducted during plans and specifications phase to refine site selection and to ensure hardbottom habitat design that does not impact the existing reef. The surveys will gather evidence of benthic and epibenthic vertebrate and invertebrate organisms in the vicinity of the proposed hardbottom habitat.

8. Hardbottom habitat construction-Hardbottom habitat materials - The materials to be used for hardbottom habitat creation are sand and rock. The source of these materials will be the vicinity of the existing Hernando Beach

Channel. The materials will be removed during construction of channel improvements. The improvements are to be construction using mechanical equipment, possibly a barge-mounted backhoe. The materials will be transported to the site in bottom dump barges. Each barge load of material is anticipated to consist of approximately one-third sand and two-thirds limerock. The limerock will most likely be in cobbles four inches to two feet in diameter. The material has been matched with hardbottom habitat objectives, target species, and onsite characteristics to ensure compatibility. The materials are not known to be unclean. The materials are suitable for the purpose of hardbottom habitat creation. The material is not expected to pose safety concerns for divers or undue snags for fishermen. The material will allow the openness required by divers or the profile and complexity desired by fisherman. It is expected that the material will remain stable in the quiescent and storm currents anticipated to occur at the site. The hardbottom habitat material should function as desired. It should stimulate the growth of micro and macro-organisms desired on the proposed hardbottom habitat and needed by target species.

9. Hardbottom habitat design - The design of the hardbottom habitat is rows of limerock overlying a sand base. The rows will be roughly trapezoidal in shape with a height of about five feet. The rows will most likely trend north-south. Space will be left in between the rows to ensure openness of the hardbottom habitat for water circulation and therefore the encrusting or fouling of organisms associated with hardbottom habitats.

10. Hardbottom habitat maintenance and monitoring - Physical inspection of the hardbottom habitat should occur yearly and after significant storm events. Since Hernando County is already inspecting and maintaining other sites in the area no additional costs have been included with the project for maintenance and monitoring. Responsible parties must respond immediately when notified of a deficiency at the hardbottom habitat, such as missing marker buoys or hazards induced by storm movement of hardbottom habitat material. Maintaining the hardbottom habitat might include maintenance of anchoring systems or buoys.

11. Hardbottom habitat management - A management plan for the hardbottom habitat will be developed. The goal of the management plan will be to accomplish the objectives of the hardbottom habitat. Hardbottom habitat management plans should document whether the hardbottom habitat is fulfilling objectives. Information gained from the monitoring process can allow further refinement of the management process. Effective hardbottom habitat management includes notification to the public of the location and characteristics of the hardbottom habitat as well as use restrictions to eliminate damage caused by overuse.

12. Navigation - Installation of lighted or unlighted buoys marking the site may be required by the United States Coast Guard (USCG).

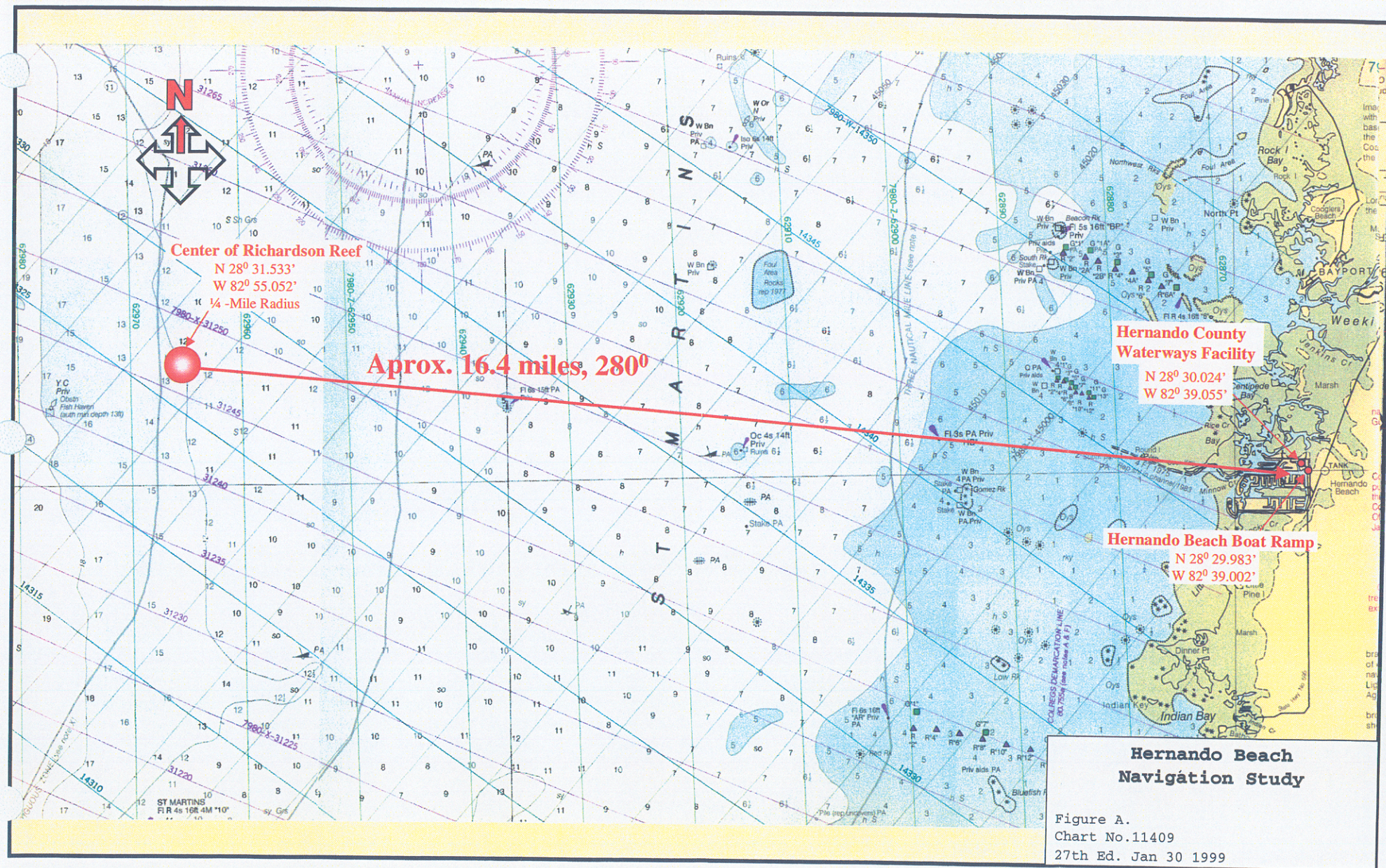
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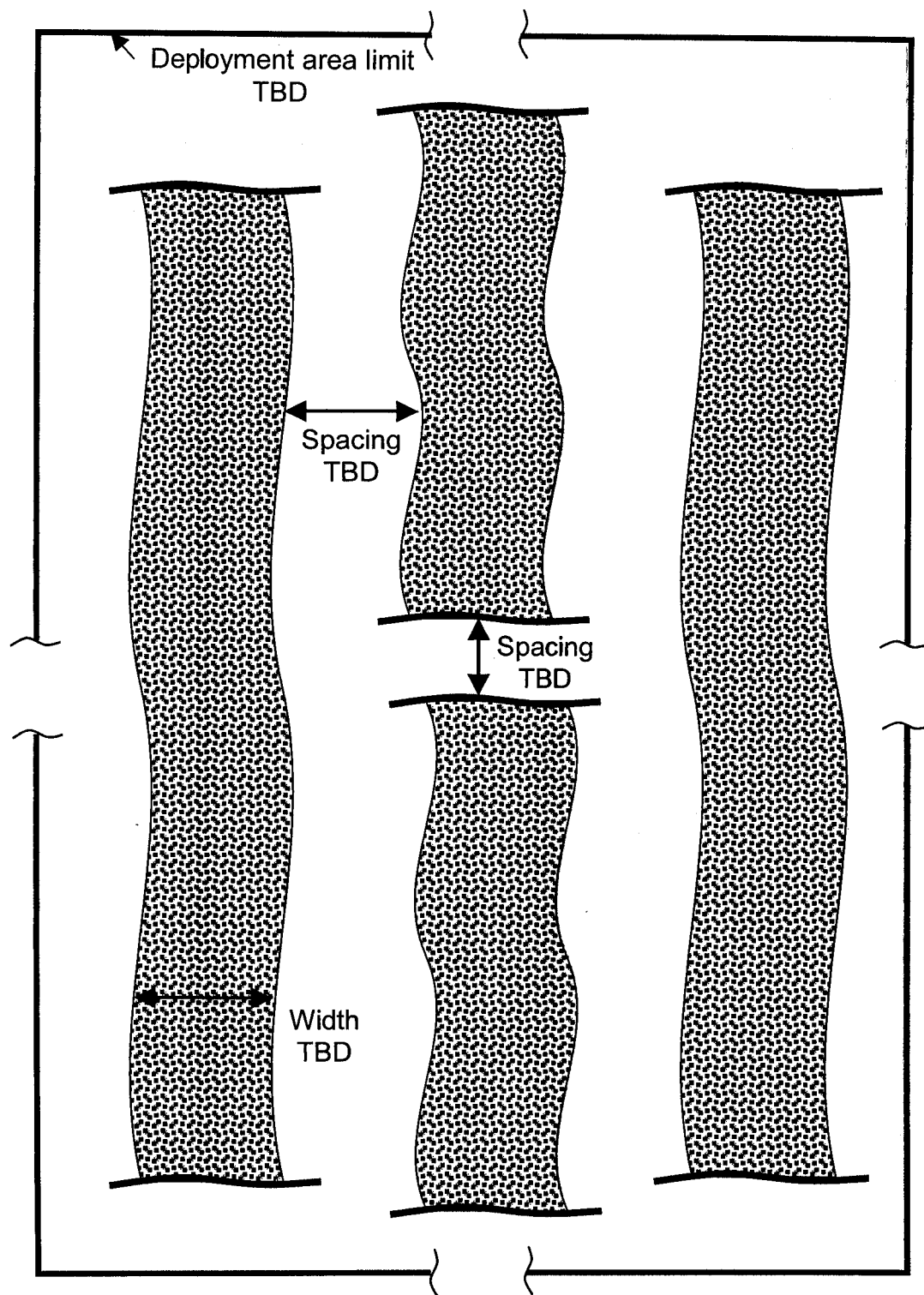
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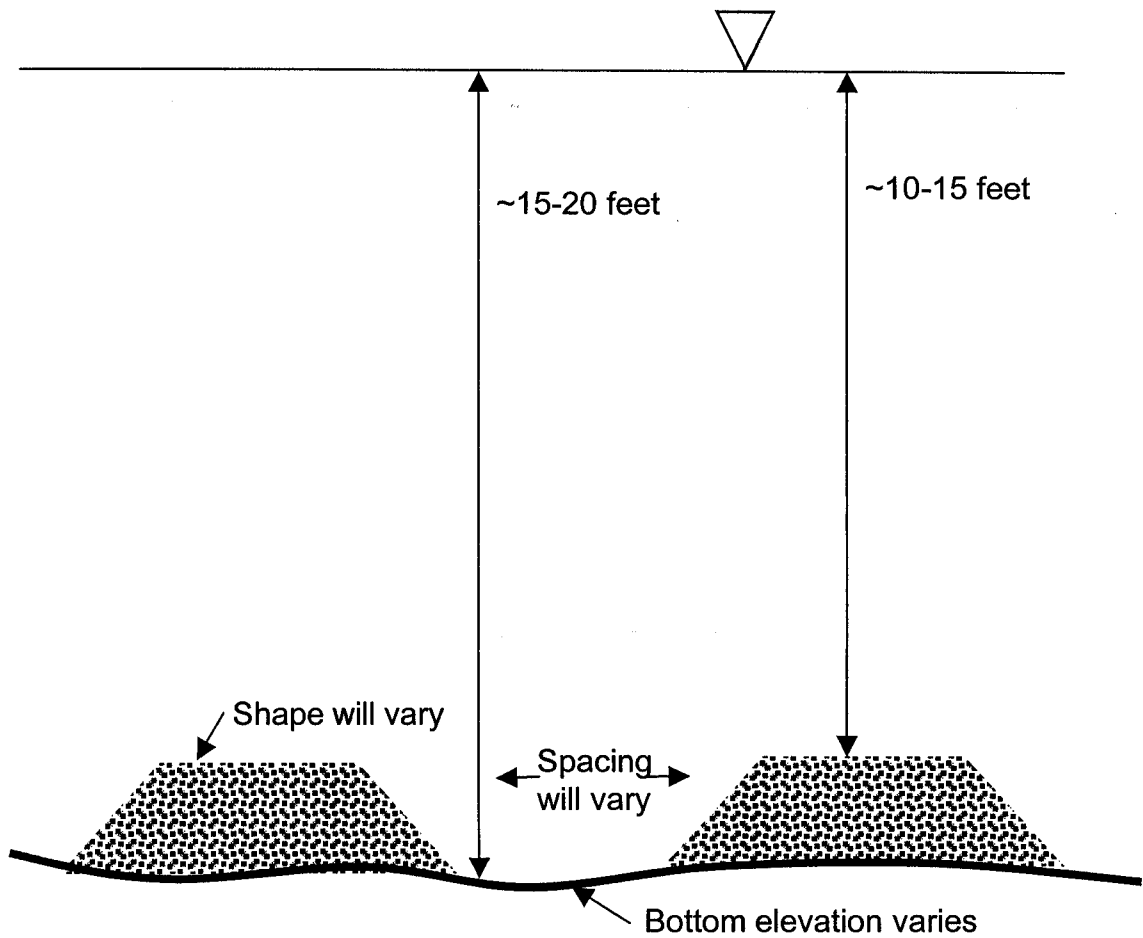


LEGEND

 Limerock and sand, varying diameters
 TBD To be determined

Not To Scale

Hernando Beach Navigation Study
Figure B.
Hardbottom habitat concept
Plan view



LEGEND



Water level



Limerock and sand,
varying diameters

TBD

To be determined

Not To Scale

Hernando Beach Navigation Study
Figure C.
Hardbottom habitat concept
Side view